

PROJECT facts

U.S. DEPARTMENT OF ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY



Clean Coal Power
Initiative (CCPI)

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TOXECON RETROFIT FOR MERCURY AND MULTI-POLLUTANT CONTROL ON THREE 90 MW COAL-FIRED BOILERS

CONTACT

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PARTICIPANT

Wisconsin Electric Power Co.
Milwaukee, WI

LOCATION

Presque Isle Power Plant
Marquette, MI

TOTAL ESTIMATED COST

\$49,536,600

COST SHARE

DOE	\$24,768,300
Participant	\$24,768,300

Project Description

Wisconsin Electric Power Company will design, install, operate, and evaluate the TOXECON process as an integrated mercury, particulate matter, SO₂, and NO_x emissions control system for application on coal-fired power generation systems. TOXECON is a process in which sorbents, including powdered activated carbon for mercury control and others for NO_x and SO_x control, are injected into a pulse-jet baghouse that is installed downstream of the existing particulate control device. The TOXECON configuration allows for separate treatment or disposal of the ash collected in the primary particulate control device. Wisconsin Electric Power Company, also known as We Energies, will be assisted by team members, including ADA-ES, who will provide program management support and design and specifications for mercury control and monitoring; Cummins & Barnard, who will provide architect and engineering services and construction management; Environmental Elements Corporation, who will provide baghouse design and installation support; and EPRI, the developer of TOXECON, who will be a technical advisor to the project.



Presque Isle Power Plant

This demonstration project will be implemented at the Wisconsin Electric Power Company's Presque Isle Power Plant located in Marquette, Michigan. The Presque Isle plant burns low-sulfur, Powder River Basin subbituminous coal, and the TOXECON unit will be installed on the combined flue gas stream of Units 7, 8, and 9, which total 270 MWe. The key objectives of the project are to 1) achieve very high levels mercury removal, 2) increase the collection efficiency of particulate matter, and 3) determine viability of sorbent injection for SO₂ and NO_x control, while maximizing the use of coal combustion by-products. The project concept is depicted in the figure on the following page.

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ADDITIONAL TEAM MEMBERS

ADA-ES
Cummins & Barnard
Environmental Elements Corp.
EPRI

ESTIMATED PROJECT DURATION

60 months

CUSTOMER SERVICE

800-553-7681

WEBSITE

www.netl.doe.gov

Benefits

A primary benefit of this project is its potential for a low-cost option for dramatic, deep cleaning of plant air emissions, especially mercury, in support of the President's Clear Skies Initiative (CSI). The CSI calls for 69% total reduction of mercury emissions, 67% reduction of nitrogen emissions, and 73% reduction of sulfur dioxide emissions (beyond current reduction requirements) with full implementation targeted to occur in 2018. This project addresses the need for mercury emission reduction from coal-fired power plants, which stems from the December 2000 U.S. EPA announcement of intent to regulate mercury emissions from the nation's coal-fired power plants. Its successful implementation will help provide an approach for segments of the power generating industry to achieve timely compliance with future mercury regulations.

It is expected that when completed in 2007, this Wisconsin Electric Power Company technology demonstration project will reduce mercury emissions by 90% and result in capture of about 80 pounds per year of mercury that would otherwise have been emitted to the environment from the three units combined. The multi-pollutant control strategy trials could be expected to reduce the already low sulfur dioxide and nitrogen oxide emissions at the plant by an additional 70% and 30% respectively, resulting in capture of 1,145 tons per year of sulfur dioxide and 428 tons per year of nitrogen oxides. In addition, the release of particulate matter would be reduced to 0.01 pounds per million BTU.

The primary attribute of the TOXECON process is that it potentially represents a low-cost option for high levels (greater than 80%) of mercury control for coal-fired power plants. This technology may prove to be the primary mercury control choice for western coals and the only choice for units burning any coal-type with hot-side electrostatic precipitators. Thus, TOXECON has application at power plants burning any coals with hot side ESP's (18GW), bituminous coals with cold side ESPs (81GS), and plants burning western, sub-bituminous coals with cold side ESP's (68GW). Using TOXECON to control SO₂ and NO_x, further enhances its attractiveness for improved environmental control.

A successful project would demonstrate a significant reduction in the rate of air emissions from Presque Isle Units 7, 8 and 9 and substantial progress towards establishing the design criteria for one of the most promising mercury control retrofit technologies available today.

